Ammonia Fact Sheet

Highlights

Ammonia is found throughout the environment in the air, soil, and water, and in plants and animals including humans. Exposure to high levels of ammonia can cause irritation and serious burns on the skin and in the mouth, throat, lungs, and eyes. At very high levels, ammonia can even cause death. Ammonia has been found in at least 137 of the 1,647 current or former National Priority Sites list identified by the Environmental Protection Agency (EPA).

What is ammonia?

Ammonia occurs naturally and is produced by human activity. It is an important source of nitrogen which is needed by plants and animals. Bacteria found in the intestines can produce ammonia.

Ammonia is a colorless gas with a very distinct odor. This odor is familiar to many people because ammonia is used in smelling salts, many household and industrial cleaners, and window-cleaning products.

Ammonia gas can be dissolved in water. This kind of ammonia is called liquid ammonia or aqueous ammonia. Once exposed to open air, liquid ammonia quickly turns into a gas.

Ammonia is applied directly into soil on farm fields, and is used to make fertilizers for farm crops, lawns, and plants. Many household and industrial cleaners contain ammonia.

What happens to ammonia when it enters the environment?

- Ammonia is found throughout the environment in air, water, soil, animals, and plants.
- Ammonia does not last very long in the environment. It is rapidly taken up by plants, bacteria, and animals.
- Ammonia does not build up in the food chain, but serves as a nutrient for plants and bacteria.

How might I be exposed to ammonia?

- Everyone is exposed to low levels of naturally-occurring ammonia in air, food, water, and soil.
- You may be exposed to higher levels during use of cleaning products containing ammonia.

- You may be exposed to higher levels if you apply ammonia fertilizers or live near farms where these fertilizers have been applied.
- You may be exposed to high levels if you go into enclosed buildings that contain lots of animals (such as on farms).

How can ammonia enter and leave my body?

After you breathe in ammonia, you breathe most of it out again. The ammonia that is retained in the body is changed into ammonium compounds and carried throughout the body in seconds.

How can ammonia affect my health?

No health effects have been found in humans exposed to typical environmental concentrations of ammonia. Exposure to high levels of ammonia in air may be irritating to your skin, eyes, throat, and lungs and cause coughing and burns. Lung damage and death may occur after exposure to very high concentrations of ammonia. Some people with asthma may be more sensitive to breathing ammonia than others.

How likely is ammonia to cause cancer?

There is no evidence that ammonia causes cancer. The Department of Health and Human Services (DHHS), the EPA, and the International Agency for Research on Cancer (IARC), have not classified ammonia for carcinogenicity.

How can ammonia affect children?

Children are less likely than adults to be exposed to concentrated levels of ammonia because most exposures occur at work. The effects on children are likely to be the same as for adults. We do not know if exposure to ammonia causes birth defects, or if it can pass to the fetus across the placenta or to infants via breast milk.

How can families reduce the risk of exposure to ammonia?

- Keep products that contain ammonia out of the reach of children.
- Make sure there is adequate ventilation when you use cleaners that contain ammonia, and wear proper clothing and eye protection.
- Never store cleaning solutions in containers that children might find attractive, like soda bottles.
- Avoid farm fields after they have been treated with ammonia or ammonia-containing fertilizers.
- Minimize exposure to ammonia in the workplace by wearing proper safety clothes and equipment, and by following safety rules.

Is there a medical test to show whether I've been exposed to ammonia?

There are tests to measure ammonia in blood and urine. These tests can not definitely determine whether you have been exposed because ammonia is normally found in our bodies.

Has the federal government made recommendations to protect human health?

The Food and Drug Administration (FDA) has salts typically found in foods do not pose a risk to human health.

The Occupational Safety and Health Administration's (OSHA) permissible exposure limit (PEL) is 50 ppm.

The Occupational Safety and Health Administration (OSHA) has set an acceptable eight-hour exposure limit at 25 parts of ammonia per one million parts of air (ppm) and a short-term (15 minutes) exposure level at 35 ppm.

EPA's Acute Exposure Guideline Levels (AEGLs):

Ammonia (ppm)

	10 min	30 min	60 min	4 hr	8 hr
AEGL 1	30	30	30	30	30
AEGL 2	220	220	160	110	110
AEGL 3	2,700	1,600	1,100	550	390

AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. AEGL-1 and AEGL-2, and AEGL-3 values are distinguished by varying degrees of severity of toxic effects. The recommended exposure levels are applicable to the general population including infants and children, and other individuals who may be susceptible.

The three AEGLs have been defined as follows:

AEGL-1

Above this airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m3) the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and may go away soon and reversible upon stopping exposure.

AEGL-2

Above this airborne concentration (expressed as ppm or mg/m3) the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL-3

Above this airborne concentration (expressed as ppm or mg/m3) the general population, including susceptible individuals, could experience life-threatening health effects or death.

Airborne concentrations below the AEGL-1 represent exposure levels that can produce mild and progressively increasing but transient and nondisabling odor, taste, and sensory irritation or certain asymptomatic, nonsensory effects.

Although the AEGL values represent threshold levels for the general public, including susceptible subpopulations, such as infants, children, the elderly, persons with asthma, and those with other illnesses, individuals could experience the effects described at concentrations below the corresponding AEGL.